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(71) Applicant: FUJITSU LTD

(72) Inventor: ARII KATSUYUKI
TAKIZAWA ATSUSHI

(54) MANUFACTURE OF DRY PLATE IN ELECTRON BEAM EXPOSURE

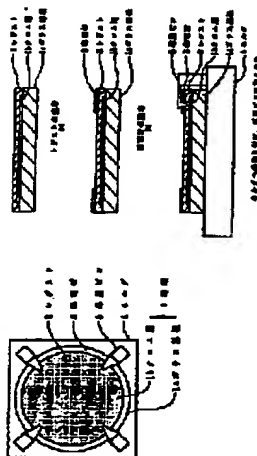
chromium layer 1b is etched to form the pattern of the chromium layer 1b.

(57) Abstract:

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PURPOSE: To avoid charging-up caused by electron beam exposure and obtain a highly accurate dry plate by a method wherein the surface of resist applied to the part of the surface of the glass substrate of the dry plate where a chromium layer is not sputtered is coated with conductive material.

CONSTITUTION: Resist 2 is applied to the surface of a dry plate 1 where a chromium layer 1b is provided. The circumferential part of the surface of the resist 2 is coated with conductive material 3 in a ring shape. The dry plate 1 is attached to a holder 4 and a continuity pin 5 is contacted with the chromium layer 1b by breaking the conductive material 3 and the resist 2 and fixed to the holder 4. If the resist 2 is exposed to an electron beam in this state, regardless of the position of the electron beam exposure, charges can be drained into the holder 4 by the continuity pin 5 without fail. After that, if the dry plate 1 is removed from the holder 4 and washed with water, as the conductive material 3 composed of PVA is water-soluble, it can be removed easily. Then the resist 2 is developed and the



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(21) Application number: 63013015

(71) Applicant: NEC CORP

(22) Date of filing: 22 . 01 . 88

(72) Inventor: SOTOOKA YOJI

(54) MANUFACTURE OF MASK AND RETICLE

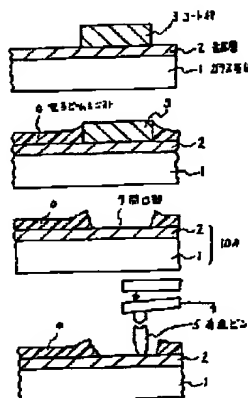
the mask or the reticle.

(57) Abstract:

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PURPOSE: To electrically connect a dry plate with a charge beam exposure unit reliably, to eliminate the storage of charges on the plate during exposure and to obviate the drift of a pattern by providing an opening for a conductive pin which is to be brought into contact with a metal film on a photoresist film in the metal film.

CONSTITUTION: When a charge beam exposure is conducted to form a pattern on a metal film 2 on a glass base 1, thereby manufacturing a mask and a reticle, an opening 7 for a conductive pin 5 to be brought into contact with the film 2 is provided in a photoresist film 4 formed on the film 2. For example, a metal layer 2 made of chromium or the like is formed on the base 1. Then, a coating material 3 made of a vinyl adhesive film or the like is coated in advance on the part to be brought into contact with the pin 5 in an exposure step. Thereafter, after the layer 2 is coated with an electron beam resist 4, the opening 7 is formed by removing the material 3, and the layer 2 of conductive substance is exposed. A dry plate 10A formed in this manner is subjected to a charge beam exposure, thereby forming



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(21) Application number: 63042871

(22) Date of filing: 25 . 02 . 88

(71) Applicant: DAINIPPON PRINTING CO LTD

(72) Inventor:
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GOTO WATARU
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HAYASHI NAOYA
KUROKAWA JUNICHI

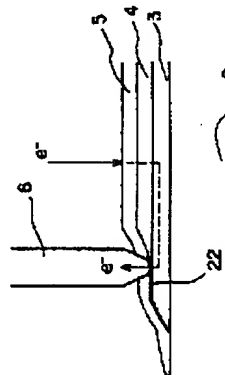
(54) BLANK PLATE, PHOTOMASK USING BLANK PLATE, AND THEIR MANUFACTURE

(57) Abstract:

PURPOSE: To prevent electrostatic charging of a blank plate at the time of electron beam drawing by providing an exposure section of a conductive light intercepting film on the surface of the blank plate and bonding a conductive pin to the exposure section.

CONSTITUTION: On the surface of the transparent base plate 2 of a blank plate an exposing section 22, where the conductive light intercepting film 3 having a smaller electric resistance which is the bottom layer is exposed, is formed. Therefore, at the time of drawing with electron beam, emitted electrons easily move to a conductive pin 6 from the conductive light intercepting film 3 having a smaller electric resistance after they pass through a resist layer 5 and reach a reflection preventing layer 4 having a larger electric resistance. Accordingly, a photomask of a precise pattern can be obtained by electron beam drawing, since no electric charge is accumulated in the photomask.

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(21) Application number: 83179411

(71) Applicant: NEC CORP

(22) Date of filing: 18 . 07 . 88

(72) Inventor: MAKITA FUTOSHI

(54) SAMPLE HOLDER FOR ELECTRON BEAM EXPOSURE DEVICE

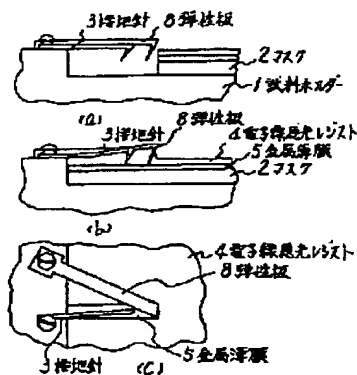
can take the place of the ground needle 3.

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(57) Abstract:

PURPOSE: To prevent ground failure by installing an elastic plate which eliminates an electron beam sensitive resist applied to the surface of a sample in a shape like a belt and a ground needle which contacts with the surface of a sample where the resist is scraped off due to an electric short developed in a member.

CONSTITUTION: An elastic plate is bent upward along the slope of its point when it hits against the side of a mask 2 that is being inserted, and steps on the surface of a mask 2. And it scrapes off a layer of electron beam sensitive resist 4 to make a metal film 5 to be exposed in a shape like a belt. As a result a ground needle 3 steps on the surface of the mask 2 such that it persues after the elastic plate 8. As the ground needle 3 comes into contact with the metal film 5 exposed in a shape like a belt because the layer of electron beam sensitive resist 4 is scraped off by the elastic plate 8, it becomes unnecessary for a ground needle to scrape off the layer of the resist 4 as before so that failure can be prevented. Moreover, as the elastic plate 8 itself has a function of grounding, it



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(21) Application number: **83278852**

(22) Date of filing: **02 . 11 . 88**

(71) Applicant: **NEC CORP**

(72) Inventor: **KAWASAKI FUMINORI**

(54) **ELECTRON BEAM EXPOSURE SYSTEM**

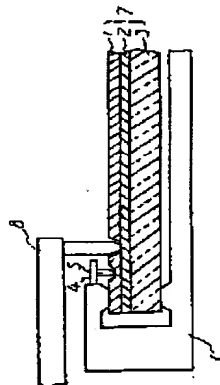
(57) Abstract:

PURPOSE: To complete conduction of a mask substrate with an aligner body, to eliminate the deflection, etc., of the mask substrate due to chargeup, a stress, and to improve lithographic accuracy by providing a high voltage applying electrode in a vacuum chamber, bringing the electrode into contact with the metal film of the mask substrate, and damaging the insulator of a medium to be exposed.

CONSTITUTION: A vacuum chamber has a cassette 6 secured with a conduction pin 5 through a leaf spring 4, and a high voltage applying electrode 8. A mask substrate 7 formed with a metal film 2 and an electron beam resist 1 on a transparent substrate 3 is set in the cassette 6, and the pin 5 is brought into contact with a resist 1 by being pressed by the spring 4 out of the pattern forming range of the substrate 7. Then, the end of the electrode 8 is brought into contact with the film 2 through the resist 1. A high voltage is applied to damage the insulator of the resist 1 to completely make the pin 5 continuous with the film 2, and when a pattern lithography is conducted, the electrode 8 is removed from above the substrate 7. Thus, it is not necessary to

apply a strong force to the pin 5 to pass through the resist 1, and a deflection, etc., does not occur at the substrate 7.

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(21)Application number: 63279730

(71)Applicant: NEC CORP

(22)Date of filing: 04 . 11 . 88

(72)Inventor: MAKITA FUTOSHI

(54)SAMPLE HOLDER FOR ELECTRON BEAM
DRAWING EQUIPMENT

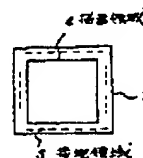
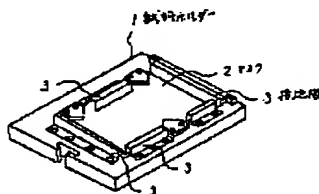
(57)Abstract:

PURPOSE: To prevent the generation of magnetic field which deflects an electron beam for drawing by arranging a plurality of grounding plates or grounding pins around a sample holder, so as to surround the image drawing region of a retained sample substrate.

CONSTITUTION: For example, grounding plates 3 composed of phosphor bronze, which come into contact with the metal film of a mask 2 are grounded, are arranged on the peripheral part of a sample holder 1, so as to surround an image drawing region 4 of a mask 2. When the mask 2 is retained by the sample holder 1, the grounding plates 3 are brought into contact with the metal film by spring energy, and a grounding region 5 is formed. When an electron beam is incident at any position of the image drawing region 4 of the mask 2, electrons continue to radially spread from an incidence point, and flow out from the nearest grounding region 5 through

the grounding plate 3, so that the biasing of electron flow can be eliminated. Thereby, the generation of magnetic field which deflects the incidence position of electron beam can be reduced.

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(21) Application number: 02063241

(71) Applicant: MATSUSHITA ELECTRON CORP

(22) Date of filing: 14 . 03 . 90

(72) Inventor: YAMAO TATSUHIKO

(54) METHOD FOR CONTINUITY TO SPECIMEN

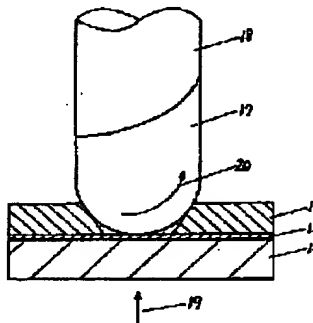
holder and the specimen.

(57) Abstract:

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PURPOSE: To guarantee a continuity surely and without its deterioration by a method wherein, while a cylindrical continuity pin whose tip is round is being pressed onto a specimen, the pin is turned by using a point, where the continuity pin comes into contact with the specimen, as a fulcrum.

CONSTITUTION: Specimens 14 to 18 are fixed to a holder; cylindrical continuity pins 17, 18 whose tip is round are pressed onto the specimens 14 to 16. While the continuity pins 17, 18 are being pressed, they are turned by using a point, where the continuity pins 17, 18 come into contact with the specimens 14 to 16, as a fulcrum. For example, continuity pins 17, 18 which are composed of a rotary part 17 and a fixed part 18 and whose tip is thick and has been rounded so as to increase a contact area are pressed onto a specimen which is composed of a mask blank 14, a chromium film 15 and a resist 16. The rotary part 17 is turned in the direction of an arrow 20 by a turning force which is exerted through the blank 14; it comes into contact with the chromium film 15 by excluding the soft resist part 16; and a continuity can be established between the



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(21) Application number: 03128121

(22) Date of filing: 31 . 05 . 91

(71) Applicant: FUJITSU LTD

(72) Inventor: HAMAGUCHI SHINICHI
URAKUCHI MASAHIRO

(54) PRODUCTION OF MASK

(57) Abstract:

PURPOSE: To prevent the peeling of the damaged part generated in a light shielding film in a succeeding stage by a continuity pin at the time of electron beam exposing.

CONSTITUTION: This process for producing the mask consists of the stage for applying a resist film 2 on the mask 1 having the light shielding film 1b consisting of a metallic film deposited on a substrate, supporting the mask 1 on a mask holder 3, grounding the light shielding film 1b by obtaining continuity with a grounding jig 4 through a microhole 2a formed through the resist film 2 at the front end of the continuity pin 4a, developing the resist film 2 after plotting by electron beam exposing, etching the light shielding film 1b and peeling the resist film 2. The damaged part 1c of the light shielding film 1b generated by the continuity pin 4a of the grounding jig 4 is selectively removed or selectively coated with a protective film 5 after the resist film 2 is peeled.

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